E.1
12/21/94

December 21, 1994

EPA Region 5 Records Ctr.
227130

Mr. Richard Sustich
MWRD
P.O. Box 10654
Chicago, IL 60610

RE: Waste Water Generated at the Lindsay Light II Site Located at 316 East Illinois Street in Chicago, Illinois -- STS Project No. 27313-ZH

Dear Mr. Sustich:

STS Consultants LTD. (STS) has prepared this letter to inform you of our plans to dispose of the water generated during subsurface explorations at the above-referenced site. As per your request during our telephone conversations, STS has prepared this letter to inform you of the history of the site and how the water was generated.

Between 1914 and 1933 the Lindsay Light Company manufactured incandescent gas mantles in the downtown area. It is believed that some of the manufacturing and/or processing took place at the 316 East Illinois Site. The principal ingredients in gas mantle manufacture is thorium as a nitrate.

In mid-1993 the USEPA and the Illinois Department of Nuclear Safety (IDNS) performed radiation surveys on the site. During the surveys, elevated levels of gamma radiation were measured on the subject site.

In order to further evaluate the subject site, the property owner, The Chicago Dock & Canal Trust, retained STS to perform subsurface investigations. During the subsurface investigation a number of cone penetrometer borings were performed on the site. In order to decrease the possibility of cross contamination between the borings, the cone penetrometer equipment was decontaminated between boring locations. The decontamination consisted of an Alconox and water wash and water rinsing of the downhole equipment. The waste water generated from the decontamination process was retained and stored in two 55-gallon drums on-site. The volume of water resulting from the site investigation is approximately 60 gallons.

Samples of the waste water were submitted to MJW Corporation and TerraDyne for waste characterization. Copies of the waste character analyses are attached. The analytical results were forwarded to Mr. Timothy Runyon of the State of Illinois Department of Nuclear Safety. Mr. Runyon responded to the waste character analyses with the enclosed letter stating that the activity in the water was well below the average monthly limit available for release to any sanitary sewer and that "the water may be free released in any manner consistent with typical clean waste water disposal practices".

Based on Mr. Runyon's letter, STS plans to release the waste water into the catch basin located in the parking lot occupying the 316 East Illinois site which is connected to the sanitary system.

STS Consultants Ltd.
Consulting Engineers

1415 Lake Cook Road
Deerfield, Illinois 60015
708.272.6520/Fax 708.498.2721

STS is requesting that the MWRD approve the disposal of the drummed waste water into the sanitary system. If you have any questions regarding this letter, please do not hesitate to contact us.

Respectfully,

STS CONSULTANTS, LTD.

Steven T. Newlin
Project Geologist

Richard G. Berggreen
Principal Geologist

cc: Vernita Simon, USEPA

STN94:AK5:nls

STS Consultants Ltd.
Consulting Engineers

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Deerfield, Illinois 60015
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Calculations for Lindsay Light II Site Water Samples Generated from Site Investigation Activity - May 1994 for STS Project No. 27313-ZH

1) Minimum Detectable Activity (MDA) for Counting System

$$MDA = \frac{4.65\ \sigma}{E \times Vol \times 2.22\ E6}$$

$$MDA = \frac{4.65\ (0.067)}{(0.3419)(100)(2.22E6)}$$

MDA = 4.1 E-09 μCi/ml

2) Water Sample Concentration Calculations for Individual Samples (from Sample Counting Sheet)

Drum 1, #1	Results =	4.1 E-09, 4.1 E-09
	Average =	4.1 E-09 μCi/ml or MDA
Drum 1, #2	Results =	4.1 E-09, 2.8 E-09
	Average =	3.45 ± 0.65 E-09 μCi/ml
Drum 2, #1	Results =	4.1 E-09, 1.7 E-08, 9.5 E-09
	Average =	1.0 ± 0.53 E-08 μCi/ml
Drum 2, #2	Results =	4.1 E-09, 4.1 E-09
	Average =	4.1 E-09 μCi/ml or MDA

3) Overall Average Concentrations and Standard Deviation

Drum 1 - 3.78 ± 0.65 E-09 μCi/ml or <MDA

Drum 2 - 7.76 ± 5.67 E-09 μCi/ml

The 10 CFR 20, Table 2, Column 2 concentration limit for Thorium-232 in water releases is 3 E-08 μCi/ml. The monthly average limit for releases to sanitary sewers is 3 E-07 μCi/ml. The above analyses show that the water generated from the on-site work is essentially non-radioactive and can be free released as necessary.

SAMPLE COUNTING SHEET

M.J.W. JOB NO. 142-94-073-01 DATE 9/13-14/94 TIME 1500

LOCATION MJW Office INSTRUMENT MODEL Ludlum 1000

INSTRUMENT SERIAL NO. 64322 PROBE MOD./SER. Ludlum 43-10/054854

CALIBRATION DATE 4/30/94 CHECKED BY DAD EFFICIENY (%) 7574/21,534 = 35.17%

HIGH VOLTAGE SETTING 900V THRESHOLD N/A WINDOW N/A

9/13 BACKGROUND COUNTS 7 COUNTING TIME 10 BKG RATE 0.7 CPM

SMEAR ALPHA	TYPE B/G	SAMPLE NUMBER/ID	COUNTING TIME (MIN)	GROSS COUNTS	GROSS CPM	NET CPM	DPM	uCi/ml
9/13		BACKGROUND	100	74	0.74	—	—	—
9/14		BACKGROUND	100	61	0.61			
✓	9/13	DRUM 1, #1	1	1	1.0	0.32	0.91	4.1E-09
✓	"	DRUM 1, #2	1	1	1.0	0.32	0.91	4.1E-09
✓	"	DRUM 2, #1	1	1	1.0	0.32	0.91	4.1E-09
✓	"	DRUM 2, #2	1	1	1.0	0.32	0.91	4.1E-09
✓	9/14	DRUM 1, #1	10	10	1.0	0.32	0.91	4.1E-09
✓	"	DRUM 1, #2	10	9	0.9	0.22	0.63	2.8E-09
✓	"	DRUM 2, #1	10	20	2.0	1.32	3.75	1.7E-08
✓	"	DRUM 2, #2	10	10	1.0	0.32	0.91	4.1E-09
✓	"	α Source	1	7151	7151	7150	33.2%	OK
✓	"	DRUM 2, #1	100	142	1.42	0.74	2.1	9.5E-09

TECHNICIAN: D. A. Dooley VERIFICATION: James V Wurzinski DATE 9/15/94

TELEDYNE BROWN ENGINEERING
Environmental Services
Midwest Laboratory
700 Landwehr Road • Northbrook, IL 60062-2310
Phone (708) 564-0700 • Fax (708) 564-4517

Mr. Steve Newlin
STS Consultants LTD
1415 Lake Cook Road
Deerfield, IL 60015

LABORATORY REPORT NO.:	8100-3184
DATE:	10-10-94
SAMPLES RECEIVED:	09-29-94
TYPE OF REPORT:	COMPLETE
PURCHASE ORDER NO.:	STS *27313-ZK

Dear Mr. Newlin:

Below are the results of the analyses for gross alpha and gross beta in two (2) water samples collected September 27, 1994.

Sample Description	Lab Code	Concentration (pCi/L) gross α	gross β
Drum-1	SPW-5184	1.2±1.0	6.1±1.3
Drum-2	SPW-5185	<0.9	12.9±0.7

The error given is the probable counting error at 95% confidence level. Less than values are based on 3 sigma counting error for background samples.

Sincerely,

Tony Coorlim,
Special Projects

TC:lsd

APPROVED BY L. G. Huebner, M. S.
Manager

SAMPLES RETAINED THIRTY DAYS AFTER ANALYSIS

STATE OF ILLINOIS
DEPARTMENT OF NUCLEAR SAFETY
1035 OUTER PARK DRIVE
SPRINGFIELD, ILLINOIS 62704
217-785-9900
217-782-6133 (TDD)

Jim Edgar
Governor

Thomas W. Ortciger
Director

December 6, 1994

Mr. Richard Berggreen
STS Consultants Ltd.
1415 Lake Cook Road
Deerfield, Illinois 60015

Dear Mr. Berggreen:

This letter is in response to correspondence from your office dated November 17, 1994 regarding disposal of waste water generated during your company's characterization of Thorium 232 contamination at 316 E. Illinois St. in Chicago, Illinois. Review of the MJW Corporations analytical results for samples of the waste water indicate gross alpha/beta activity to be at or below the minimum detectable activity (4.1 E-09 uCi/ml) for the counting system used. Although the water was not generated as part of an activity licensed by the Illinois Department of Nuclear Safety, analytical results confirm that the activity in the subject sample is well below the average monthly limit of 3.0 E-08 uCi/ml available for release to any sanitary sewer.

Based on the above information we concur that the water may be free released in any manner consistent with typical clean waste water disposal practices and the goals of the project. If you have questions regarding this correspondence please feel free to call me at (217) 786-6365.

Sincerely,

Timothy A. Runyon, Chief
Division of Environmental Monitoring

cc: Richard Allen, OES
Vernita Simon, USEPA

recyclable

3) Monitor all packages known to contain radioactive material for radioactive contamination and radiation levels if there is evidence of degradation of package integrity, such as packages that are crushed, wet or damaged.

c) The licensee shall perform the monitoring required by subsection (b) above as soon as practicable after receipt of the package, but not later than 3 hours after the package is received at the licensee's facility if it is received during the licensee's normal working hours or if there is evidence of degradation of package integrity, such as a package that is crushed, wet or damaged. If a package is received after working hours, and has no evidence of degradation of package integrity, the package shall be monitored no later than 3 hours from the beginning of the next working day.

d) The licensee shall immediately notify the final delivery carrier and the Department, by telephone and either telegram, mailgram or facsimile, when:

1) Removable radioactive surface contamination exceeds the limits of 32 Ill. Adm. Code 341.150(h); or

2) External radiation levels exceed the limits of 32 Ill. Adm. Code 341.150(i) and (j).

e) Each licensee shall:

1) Establish, maintain and retain written procedures for safely opening packages in which radioactive material is received; and

2) Ensure that the procedures are followed and that special instructions for the type of package being opened are adhered to.

SUBPART K: WASTE DISPOSAL

Section 340.1010 General Requirements

a) A licensee shall dispose of licensed material only:

1) By transfer to an authorized recipient as provided in Section 340.1060 or in 32 Ill. Adm. Code 330, 332 or 601, or to the U.S. Department of Energy; or

2) By release in effluents within the limits in Section 340.310; or

3) As authorized pursuant to Sections 340.1020, 340.1030, 340.1040 or 340.1050.

b) A person shall be specifically licensed by the Department prior to receiving waste containing licensed material from any other point of generation for:

1) Treatment prior to disposal; or

2) Treatment or disposal by incineration; or

3) Disposal at a land disposal facility licensed pursuant to 32 Ill. Adm. Code 601; or

4) Storage until transferred to a disposal facility authorized to receive the waste.

Section 340.1020 Method for Obtaining Approval of Proposed Disposal Procedures

A licensee or applicant for a license may apply to the Department for approval of proposed procedures, not otherwise authorized in 32 Ill. Adm. Code: Chapter II. Subchapters b and d, to dispose of licensed material generated in the licensee's operations. Each application shall include:

a) A description of the waste containing licensed material to be disposed of, including the physical and chemical properties that have an impact on risk evaluation, and the proposed manner and conditions of waste disposal;

b) An analysis and evaluation of pertinent information on the nature of the environment;

c) The nature and location of other potentially affected facilities; and

d) Analyses and procedures to ensure that doses are maintained ALARA and within the dose limits in this Part.

Section 340.1030 Disposal by Release into Sanitary Sewerage

a) A licensee may discharge licensed material into sanitary sewerage if each of the following conditions is satisfied:

1) The material is readily soluble, or is readily dispersible biological material, in water;

2) The quantity of licensed radioactive material that the licensee releases into the sewer in 1 month divided by the average monthly volume of water released into the sewer by the licensee does not exceed the concentration listed in Table 3 of Appendix B to 10 CFR 20.1001 - 20.2401, effective January 1, 1994, exclusive of subsequent amendments or editions;

3) If more than one radionuclide is released, the following conditions must also be satisfied:

A) The licensee shall determine the fraction of the limit in Table 3 of Appendix B to 10 CFR 20.1001 - 20.2401, effective January 1, 1994, exclusive of subsequent amendments or editions, represented by discharges into sanitary sewerage by dividing the actual monthly average concentration of each radionuclide released by the licensee into the sewer by the concentration of that radionuclide listed in Table 3 of Appendix B to 10 CFR 20.1001 - 20.2401, effective January 1, 1994, exclusive of subsequent amendments or editions; and

B) The sum of the fractions for each radionuclide required by subsection (a)(3)(A) above does not exceed unity;

			Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				
Atomic No.	Radionuclide	Class	ALI (μCi)	ALI (μCi)	DAC (μCi/ml)	Air (μCi/ml)	Water (μCi/ml)	Monthly Average Concentration (μCi/ml)
89	Actinium-228	D, see ^{224}Ac	2E+3	9E+0	4E-9	-	3E-5	3E-4
			-	Bone surf (2E+1)	-	2E-11	-	-
		W, see ^{224}Ac	-	4E+1	2E-8	-	-	-
			-	Bone surf (6E+1)	-	8E-11	-	-
		Y, see ^{224}Ac	-	4E+1	2E-8	6E-11	-	-
90	Thorium-226[2]	W, all compounds except those given for Y	5E+3	2E+2	6E-8	2E-10	-	-
			St. wall (5E+3)	-	-	-	7E-5	7E-4
		Y, oxides and hydroxides	-	1E+2	6E-8	2E-10	-	-
90	Thorium-227	W, see ^{226}Th	1E+2	3E-1	1E-10	5E-13	2E-6	2E-5
		Y, see ^{226}Th	-	3E-1	1E-10	5E-13	-	-
90	Thorium-228	W, see ^{226}Th	6E+0	1E-2	4E-12	-	-	-
			Bone surf (1E+1)	Bone surf (2E-2)	-	3E-14	2E-7	2E-6
		Y, see ^{226}Th	-	2E-2	7E-12	2E-14	-	-
90	Thorium-229	W, see ^{226}Th	6E-1	9E-4	4E-13	-	-	-
			Bone surf (1E+0)	Bone surf (2E-3)	-	3E-15	2E-8	2E-7
		Y, see ^{226}Th	-	2E-3	1E-12	-	-	-
			-	Bone surf (3E-3)	-	4E-15	-	-
90	Thorium-230	W, see ^{226}Th	4E+0	6E-3	3E-12	-	-	-
			Bone surf (9E+0)	Bone surf (2E-2)	-	2E-14	1E-7	1E-6
		Y, see ^{226}Th	-	2E-2	6E-12	-	-	-
			-	Bone surf (2E-2)	-	3E-14	-	-
90	Thorium-231	W, see ^{226}Th	4E+3	6E+3	3E-6	9E-9	5E-5	5E-4
		Y, see ^{226}Th	-	6E+3	3E-6	9E-9	-	-
90	Thorium-232	W, see ^{226}Th	7E-1	1E-3	5E-13	-	-	-
			Bone surf (2E+0)	Bone surf (3E-3)	-	4E-15	3E-8	3E-7
		Y, see ^{226}Th	-	3E-3	1E-12	-	-	-
			-	Bone surf (4E-3)	-	6E-15	-	-
90	Thorium-234	W, see ^{226}Th	3E+2	2E+2	8E-8	3E-10	-	-
			LLI wall (4E+2)	-	-	-	5E-6	5E-5
		Y, see ^{226}Th	-	2E+2	6E-8	2E-10	-	-
91	Protactinium-227[2]	W, all compounds except those given for Y	4E+3	1E+2	5E-8	2E-10	5E-5	5E-4
		Y, oxides and hydroxides	-	1E+2	4E-8	1E-10	-	-
91	Protactinium-228	W, see ^{227}Pa	1E+3	1E+1	5E-9	-	2E-5	2E-4
			-	Bone surf (2E+1)	-	3E-11	-	-
		Y, see ^{226}Pa	-	1E+1	5E-9	2E-11	-	-